The Influence of Infant Food Packaging Design on Perceptions of Kenyan Consumers: Conjoint Analysis Combined with Eye Tracking

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ABSTRACT

Locally produced, healthy and affordable foods for children based on traditional recipes have the potential to improve the high rates of child malnutrition in Africa's drylands. Professional, informative packaging is needed for women's groups producing such foods to access the formal market. To identify suitable packaging designs, a conjoint experiment was combined with eye tracking. 16 packaging designs were created (D-efficient design), randomly displayed and rated for attractiveness by 98 participants. Overall, the results suggest that packaging designs for children's foods that include food safety symbols and detailed nutritional information could help Kenyan consumers build trust in the product being offered. Consumers gain information from images showing the product's ingredients and a logo composed of the colours of the Kenyan flag. The image of a cute cartoon animal helps consumers identify the product as a children's food.

Keywords: Nutritional choices; malnutrition; convenience foods.

1   Introduction

Child malnutrition is a widespread problem in African drylands. Those affected are hindered from developing their individual potentials, leading to reduced development opportunities of entire countries (Bagriansky, Champa, Pak, Whitney, and Laillou, 2014). This is accompanied by irreversible adverse health effects and exacerbated poverty (Adebisi et al., 2019). Malnutrition is caused by, among other factors, care practices that are not clearly linked to income (Herforth and Ahmed, 2015).

In peri-urban areas in particular, a food transition is taking place. This means that commercially available, diverse packaged child foods are increasingly used in child feeding (Debela, Demmler, Klasen, and Qaim, 2020), but do not sufficiently address issues of food and nutrition insecurity. Concerns about food safety and quality are also increasing as traditional supply chains become longer and more complex (Reardon et al., 2021). At the same time, local women's groups produce healthy, affordable infant foods based on traditional recipes that they would like to sell for income, but currently have access only to simple, clear plastic bags and not to professional, informative packaging that would allow them to enter the formal market (Roba, personal communication, 2021).

As data on the influence of packaging design on the perception and choice of children's food in Kenya is scarce, the main objective of the present study is to reveal the packaging preferences of Kenyan parents. Detailed knowledge of these preferences might help fighting malnutrition: Offering healthy, affordable infant foods based on traditional recipes in food packaging, designed based on consumers' preferences might nudge consumers to choose these foods over less healthy options and thus increase the amounts of healthy, nutritious foods consumed by infants, thereby fighting malnutrition. Additionally, an increase in the consumption of locally produced foods will strengthen the local economy, create employment and reduce poverty.

We respond to the question by performing a literature review and explaining the methodology used before presenting the results. In the discussion, we draw out from our data the contributions to knowledge. The final section concludes the paper and comments on the limitations.

2   Literature review

In addition to its basic function of containing and protecting products, packaging is an important vehicle for branding and communication. Packaging uses a range of attributes such as colours, shapes, symbols and messages (Silayoi and Speece, 2004; Silayoi and Speece, 2007). These design elements influence consumers' purchase decisions in-store and are a key factor in the success of product marketing strategies (Rettie and Brewer, 2000), especially when consumers have to choose between similar products (Gómez, Martín-Consuegra, and Molina, 2015). Consumer purchase intention depends on the extent to which consumers expect the product to meet their expectations for its use (Kupiec and Revell, 2001).

If the packaging communicates high quality, consumers often assume that the product is of high quality. If the packaging symbolises low quality, consumers transfer this perception of "low quality" to the product itself (Silayoi and Speece, 2004; Underwood, Klein, and Burke, 2001). The packaging becomes a symbol that conveys positive or negative implicit meanings about the product. Underwood et al. (2001) suggest that consumers are more likely to spontaneously imagine aspects of how a product looks, tastes, feels, smells or sounds when viewing product images on packaging.

The increasing importance of packaging from a marketing perspective, especially in self-service outlets, has been highlighted by several authors (Peters-Texeira and Badrie, 2005; Rettie and Brewer, 2000). However, due to the influence of culture on communication, the communicative features of global packaging designs are less effective than product designs adapted to local levels and cultures (van den Berg-Weitzel and van de Laar, 2001). When designing food packaging for children's foods, it is important to consider who decides to purchase these foods. While the availability and distribution of resources within households in Kenya affects women's decision-making ability, various researchers agree that women are generally responsible for nutritional decisions, including the purchase of child foods (Bikketi, Ifejika Speranza, Bieri, Haller, and Wiesmann, 2016; Brunson, Shell-Duncan, and Steele, 2009; Muraya, Jones, Berkley, and Molyneux, 2017).

Conjoint analysis has been widely used in marketing research to determine consumer preferences for product attributes (Backhaus, Erichson, Gensler, Weiber, and Weiber, 2021), including products in the food sector (Alphonce and Alfnes, 2012; Oenning, Guimarães Junior, and Medeiros, 2018; Silayoi and Speece, 2007). The basic idea of conjoint analysis is to decompose consumers' overall preference for a product into preferences for attribute levels. The attributes included in a conjoint analysis should cover those that are most relevant to potential consumers and that can be influenced or manipulated by the producer. The attribute levels should represent what is realistic and feasible but should be limited to the most important ones from a methodological point of view (Backhaus et al., 2021). In the case of packaging design,

one attribute that could be influenced by the producer might be colour, which could have the attribute levels red, green and yellow; another attribute might be a specific food certificate, with the attribute levels present or absent. The aim of conjoint analysis is to calculate the contribution of each attribute level (i.e., in the example above, the part-worth of each colour included and the presence or absence of the label) to the total utility of the product for the consumer. This knowledge makes it possible to simulate the expected most successful product on the market by combining the attribute levels with the highest part-worth (Backhaus et al., 2021).

However, it is not possible to deduce from the results of a conjoint analysis whether all packaging attributes included in the conjoint analysis were actually included in the decision-making process (Meyerding, 2018). It is known from eye-tracking research that different packaging attributes attract visual attention to different degrees (Fenko, Nicolaas, and Galetzka, 2018; Piqueras-Fiszman, Velasco, Salgado-Montejo, and Spence, 2013; Sielicka-Różyńska, Jerzyk, and Gluza, 2021). Certain packaging attributes may not receive any visual attention at all, i.e. these elements are not visually fixated (Meyerding, 2018). Fixations can be described as gaze patterns in which the eyes remain relatively still over a period of time and are focused on a small area. It is thought that the visual system mainly takes in information during fixations and that cognitive information processing follows visual information processing (Geise, 2011). This implies that attributes that are not fixated are not cognitively processed and therefore cannot contribute to decision making when evaluating a product. Eye-tracking can be a valuable complement to a conjoint experiment on packaging design by revealing participants' visual attention to packaging attributes, thus providing reliable information on how potential consumers visually process packaging attributes (Meyerding, 2018).

3   Data and Methods

3.1   Determination of stimuli for conjoint and eye tracking study

A pre-study was conducted in Marsabit, Kenya, to determine the study's stimuli, i.e., the types of child foods included and the specification of the design elements (attributes) and their characteristics (attribute levels) (Cramer, Schröter, Roba, Wario, and Mergenthaler, 2021). In this pre-study, data about bestselling and unpopular child foods and consumers' main reasons for accepting or rejecting the mentioned products were collected and analysed. Packaging designs were analysed for their visual content and, additionally, members of a local women's group producing different plant-based infant food products, were interviewed about local preferences for infant foods and their packaging.

In collaboration with the women's group, porridge was selected as the product to be tested in the present study, as cereals and porridge are regularly consumed by children in Kenya. Photographs of best-selling and unpopular porridge packagings were analysed and relevant packaging attributes and their varying levels were identified as stimuli for a conjoint analysis. In addition, logos were developed in collaboration with a local women's group producing infant food and included in the study. For the conjoint study, 16 stimuli (D-efficient design) were derived from this groundwork (Table 1).

Table 1.
Attributes and attribute levels of conjoint analysis

	Colour	Background Element	Logo	Nutritional Information	Kenyan food safety mark (KEBS mark)	Image of Cute Animal
Level 1	Red	Ribbon	Shape of Africa, child	Traffic light label	Yes	Yes
Level 2	Blue	Oval	Shape of Kenya, colours of the Kenyan flag, child	Detailed nutritional information	No	No
Level 3	Yellow	Rectangular	Shape of Kenya, colours of the Kenyan flag, mother and child	No		

Based on these stimuli, 16 different images of infant food packaging were created, each showing a brown paper bag with a white sticker. The white sticker showed the elements for the conjoint study as well as images of the porridge's ingredients were shown (Figure 1). The ingredients of the porridge were the same on each packaging design and are therefore not included in the conjoint study.

Figure 1. Examples of images of infant food packaging used in conjoint analysis.

3.2 Participants' details

A convenience sample was drawn from consumers in different neighbourhoods of Marsabit town in northern Kenya. Rather than trying to recruit respondents with a socio-demographic profile similar to that of the Kenyan population, the focus was on targeting a specific segment of the population, namely infant food purchasers. Therefore, mothers were the main target group.

98 consumers were briefed on the nature and context of the research and completed the study in December 2021. Guidance and assistance were provided by an assistant who read and, if necessary, translated the questions and possible answers for illiterate and non-English speaking respondents. Intrinsic motivation of participants was considered important and therefore a remuneration in the form of food was offered to respondents only once the data collection was complete.

65% of participants indicated that they were currently caring for children, 17% indicated that they were planning to care for children in the near future, 17% were neither currently caring for nor planning to care for children, and 1% did not answer the question.

3.3 Data collection method

The study consisted of the eye-tracking study, and an online questionnaire, which included a traditional conjoint experiment (TCA). As the monitoring of eye movements and participants' attention to the stimuli is more instinctive and stimulus-driven when they have not been given a task or asked a question (Meyerding, 2018), the study was conducted in two steps.

In the first step, the eye tracking study, participants were shown the 16 different images of infant food packaging which were created for the conjoint experiment (c.f., section 2.1). The images were presented in a random order on a computer screen. Each image was displayed for 8 seconds, with a white screen displayed for 2 seconds between images. The hardware used to record the eye tracking data was a myGaze remote eye tracking device (binocular ET, sampling rate 30 Hz, manufacturer SMI Senso Motoric Instruments) and the Eyevido Cloud software was used to store and process the data. All attributes included in the conjoint study, except colour, were defined as Areas of Interest (AOI) in order to analyse the respondents' gaze behaviour in these areas, i.e., the number of fixations per AOI (fixation count), the time to first fixation and the fixation duration.

In the second step, the participants answered a questionnaire and took part in the conjoint experiment. The survey questionnaire consisted of four main parts. The first section was designed to obtain information on the socio-demographic profile of the respondents and included the following indicators: Gender, age, place of residence (rural / urban), type of material used to build the walls of the respondent's house (as a proxy for economic well-being), whether they take, have taken or plan to take care of children. The second part inquired about the food purchasing frequency of participants and their interest in the origin of packaged food. Chen's (2007) adapted version of the Food Neophobia

Scale (FNS), a psychometric instrument used to assess the willingness to eat and explore new foods was used and respondents were asked to express their level of agreement on a scale from 1 to 5, with 1 being the minimum and 5 being the maximum level of agreement. Positive items were inverted before the final data analysis. The fourth part of the questionnaire explored the respondent's health consciousness and their willingness to meet their children's nutritional needs and desires by asking them to express the frequency of their respective choice on a scale of 1 to 5.

During the conjoint experiment, the 16 packaging images were shown in random order to respondents who rated them in terms of the perceived attractiveness of the packaging designs on a scale of 1 to 10 with 10 being the highest level of affirmation.

3.4 Statistical analysis

Statistical analyses were performed using Stata version 16.1 and Excel. As not all participants answered all questions, all analyses were conducted using the maximum amount of information available. Sample size is reported for each analysis.

The Eyevido Cloud software used to record the data calculates the eye-tracking rate for each participant, which is the ratio of valid eye-tracking data to erroneous data. While all 98 respondents participated in the eye-tracking study, only the data of the 81 respondents with an eye-tracking quota of ≥ 70% were further analysed.

4 Results

4.1 Socio-demographic results, food purchase behaviour, FNS and interest in nutrition

86% of participants were female, 9% were male and 5% did not specify their gender. The mean age of the participants was 39.11 ± SD 12.83 years. The majority of participants, 89%, lived in cities, 8% in villages or other rural areas and 3% did not answer the question. 55% lived in a house with cement walls, 38% in a house with mud walls, 6% in a house with corrugated iron walls and 1% did not answer. These responses suggest that the socio-economic status of the respondents is slightly better than that of the population of Marsabit County, where 56% of residents are classified as 'food poor', meaning they lack the means to meet their minimum basic food consumption needs (Kenya National Bureau of Statistics, 2018).

The vast majority of respondents who were caring for children (n=63) responded that they bought baby food (98%), packaged food (89%), and packaged baby food (87%) more than once a week (Figure 2).
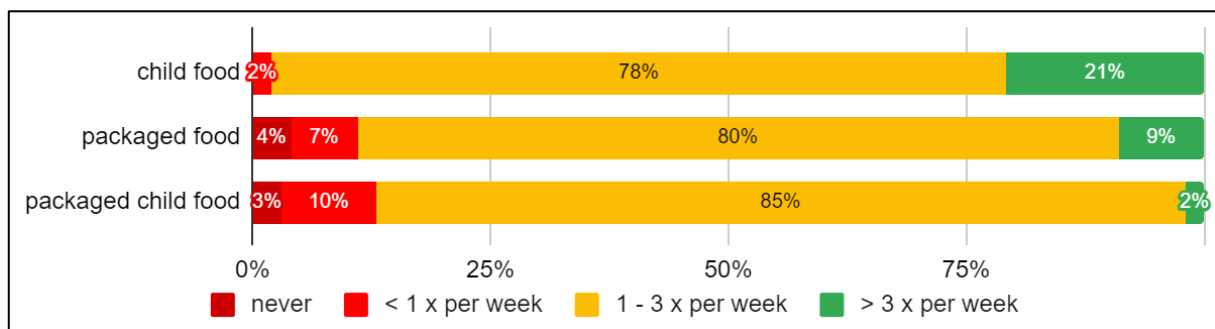

Figure 2. Responses re frequency of food purchases

26% of respondents were interested in the origin of the packaged food they buy, while 70% were not interested and 4% did not answer the question. 94% of participants would like to buy more Kenyan food, while 2% would not and 4% did not answer. (n = 98 for both questions).

Calculating the results from the participants' expressions of agreement or disagreement on a scale of 1 to 5 to the items on the Food Neophobia Scale (FNS) revealed that the mean FNS score for the sample was 3.21. '1' represented the minimum and '5' the maximum level of agreement, so a '3' meant neither agreement nor disagreement. The score of 3.21 therefore indicates that the sample can be defined as mildly food neophobic (Table 2).

The majority of respondents expressed that they very often or always read the nutritional information on the packaging (80%), that they take their children's development into account when choosing food (94%), that they are concerned about the quality of the food they eat (99%), that they prepare extra meals according to their children's preferences (92%) and that they are influenced by their children when deciding what to eat as a family (71%) (Figure 4).

Table 2.
FNS scores

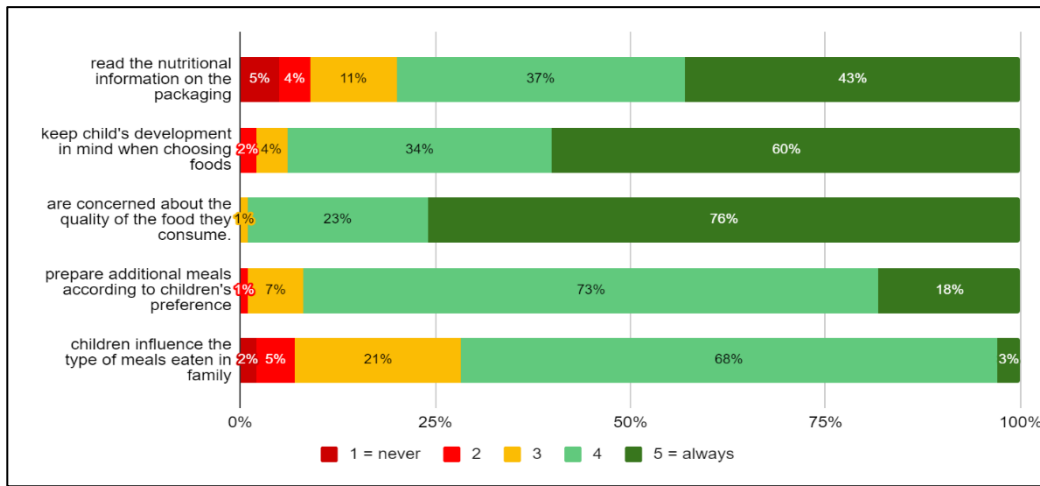|	Mean	Standard deviation
I do not trust new foods.	3,77	1,25
I am constantly sampling new and different foods (R).	1,96	0,91
I am afraid to eat things I have never had before.	3,50	1,49
I will eat almost anything (R).	2,88	1,62
If I do not know what is in a food, I won't try it.	3,97	1,32
n=96	3,21	1,52

Figure 3. Responses: Expression of health consciousness and willingness to satisfy the nutritional needs and desires of their children

4.2 Qualitative eye tracking results

The results of the qualitative analysis of eye tracking are presented in the form of heat maps. Heat maps visualise how intensely recipients fixate different areas of a stimulus using the colour spectrum from red (highest fixation intensity) to yellow (moderate fixation intensity) to green (lowest fixation intensity) (Djamasbi, 2014).

The heat maps analysed show the focus of visual attention for all participants. The heat maps show that not only the defined AOIs were of interest, but also the images of the porridge ingredients displayed at the bottom of the packaging (Figure 4).
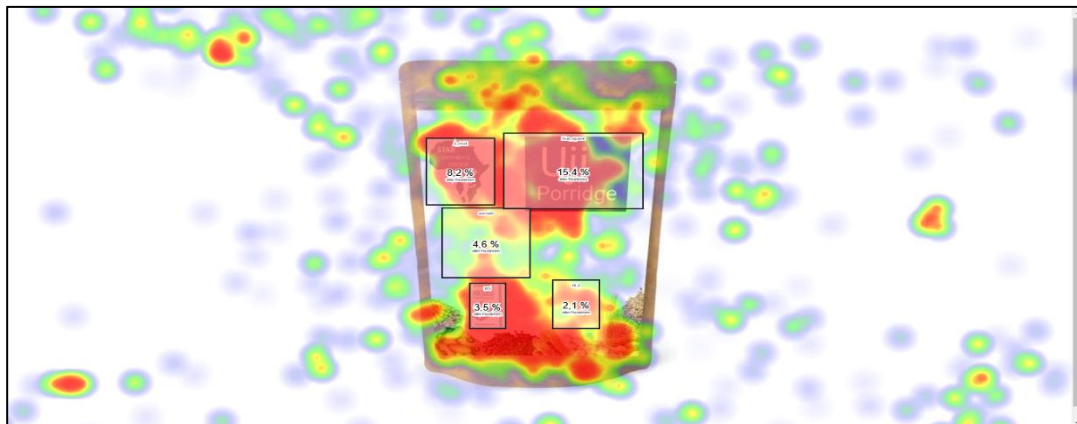

Figure 4. Example of image of a heat map

4.3   TCA results, quantitative eye tracking results and comparison between the two

In the traditional conjoint analysis, the 98 respondents each viewed 16 images, giving a total of 1568 observations. The rating of the packaging designs ranged from 6.46 (SD 0.55) for the lowest rated design to 8.83 (SD 1.41) for the highest rated design. The influence of design on attractiveness ratings was significant, as shown by the regression model (R^2 = 0.21, $p < 0.001$).

The colour 'blue', the background 'oval', the logo 'Africa + child', the nutritional information 'no nutritional information', the Kenyan food safety mark 'no Kenyan food safety mark' and the image of a cute animal 'no image of a cute animal' were the attribute levels chosen as base categories in the regression analysis to calculate part-worth utilities in the traditional conjoint analysis. The part-worth utilities of these attribute levels are therefore set to zero. The part-worth utilities of the other attribute levels can be interpreted on the basis of these base categories.

When determining the relative importance of the design elements, the Kenyan food safety mark (KEBS mark) had the highest relative importance, followed by the nutritional information. Of lower relative importance were the image of a zebra, the logo, the colour and the background element (see Table 3). Of the Kenyan food safety mark levels, the display of the KEBS mark had the highest part worth utility with a coefficient of 1.40, while the base category with no mark was 0.00. The display of detailed nutritional information generated a part worth utility of 0.96, followed by the traffic light label (abbreviated display of nutritional information) (0.88) and the base category with no nutritional information (0.00).

The illustration of a zebra generated a part worth utility of 0.28, followed by a logo showing the shape of the country Kenya and the colours of its flag together with a child (0.24). Of the colour design attribute levels, red generated the highest part worth utility (0.13).

The quantitative results of the eye-tracking study show large differences between the attributes analysed and their attributes and their attribute levels in all four categories of eye-tracking metrics: number of users with at least one fixation ("seen"), average time to first fixation, fixation duration, and number of visits.

The background element was the attribute that attracted the most attention, regardless of its attribute level: More than three quarters of respondents saw it, it was the first element they looked at, the fixation duration was the longest and the number of visits was the highest.

After fixating the background element, participants fixated the area where the image of the cute animal was displayed or not before fixating on the logo. The areas with the nutritional information and the KEBS logo were fixated last. The duration of fixation and the number of visits followed the same pattern. However, when neither the cute animal nor the KEBS mark was displayed, respondents fixated the respective areas for a shorter time and returned less often to fixate them again (Table 3).

The eye-tracking results correspond to the part-worth utilities of the TCA in these attributes when a 'no' option was included as an attribute level. The empty space ('no' option) received the least visual attention and had the lowest part-worth utility (Table 3).

5   Discussion

As data on the influence of packaging design on perceptions and choices of child food in sub-Saharan Africa are scarce, the present study aims to elucidate the packaging preferences of Kenyan parents.

Our data confirm that parents or caregivers from the very remote northern Kenyan town of Marsabit in our sample are economically active and purchase packaged child on a regular basis, at least once a week. This observation is consistent with Keding's (2016) research in rural Kenya and Tanzania, and her conclusion that the food transition, with its increased consumption of convenient and packaged foods, has reached remote areas.

The results of the conjoint analysis indicate that the Kenya Food Safety Mark (KEBS mark) is the most important attribute, and respondents found infant porridge packagings with this mark attractive. The vast majority of respondents in our study expressed their health consciousness, willingness to meet their children's nutritional needs and desires, and concern about the quality of the food they consume, supporting the impact of the KEBS mark. The visual attention given to the KEBS label is another indication of its relevance. Consumers' concerns about food quality and the impact of the KEBS food safety mark are consistent with descriptions of various food safety concerns in sub-Saharan Africa, as well as increased risk perceptions associated with income growth and urbanisation in the region (Ortega and Tschirley 2017). Previous studies from Nigeria and Malaysia found that food safety certification marks increase consumers' confidence in the food safety of a product and influence their purchase decision (Jaiyeoba, Abdullah, and Dzuljastri, 2020; Mohd Nawi and Mohd Nasir, 2014). A study from Kimilili, Kenya, found that Kenyan consumers prefer products with a food safety standard certification mark, such as the KEBS mark, which is widely known to Kenyan consumers and was identified by 92% of consumers in Kimilili (Mulama, 2011).

Table 3.
Comparison of the different attribute levels by conjoint analysis and eye-tracking

Traditional Conjoint Analysis (TCA)				Eye-tracking Study (ET)			
Number of participants: 98				Number of participants: 81			
Attribute	Attribute Level	Coeffi-cient	Std. Err.	Seen	Time to First Fixation (sec.)	Duration of Fixation (sec.)	Visits
				Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Colour	Red	0.13	0.10				
	Yellow	0.05	0.09				
	Blue	Base					
Background element	Ribbon	0.09	0.10	0.77 (0.42)	2.11 (1.86)	1.26 (1.45)	1.94 (1.73)
	Rectangular	0.01	0.10	0.80 (0.40)	2.27 (1.73)	1.24 (1.76)	2.08 (2.18)
	Oval	Base		0.79 (0.41)	2.20 (1.82)	1.18 (1.35)	1.93 (1.71)
Logo	Kenya + child	0.24**	0.09	0.55 (0.50)	3.15 (2.15)	0.53 (0.88)	0.96 (1.15)
	Kenya. mother + child	0.10	0.10	0.57 (0.50)	3.33 (2.22)	0.53 (0.81)	1.00 (1.18)
	Africa + child	Base		0.52 (0.50)	3.41 (2.30)	0.61 (1.02)	0.92 (1.30)
Nutritional information	Detailed information	0.96***	0.10	0.47 (0.50)	3.74 (1.98)	0.37 (0.58)	0.73 (0.93)
	Traffic light label	0.88***	0.10	0.46 (0.50)	5.14 (7.54)	0.37 (0.60)	0.69 (0.91)
	No	Base		0.23 (0.42)	4.23 (2.76)	0.12 (0.29)	0.28 (0.56)
KEBS mark	Yes	1.40***	0.08	0.34 (0.47)	4.70 (3.49)	0.23 (0.45)	0.44 (0.68)
	No	Base		0.21 (0.41)	4.52 (4.26)	0.10 (0.27)	0.25 (0.52)
Image of cute animal	Yes	0.28**	0.08	0.63 (0.48)	3.18 (2.32)	0.57 (0.82)	1.22 (1.32)
	No	base		0.35 (0.48)	3.15 (3.49)	0.19 (0.39)	0.54 (0.89)
	Constant	6.00***	0.13				

Note: * $P < 0.05$; **$P < 0.01$; *** $P < 0.001$

According to the conjoint analysis, the second most important element for respondents is the display of nutritional information, with the detailed nutritional information being slightly more important than the traffic light label with only the basic nutritional information. The importance consumers attach to the display of nutritional information is supported by information from the questionnaire, where the majority of respondents indicated that they very often or always read the nutritional information on food packaging. This is corroborated by the eye-tracking data, which shows a higher proportion of glances, longer fixations and more frequent visits when nutritional information is displayed compared to when there is no nutritional information on the packaging. The impact of nutritional information on consumers and their purchase decisions is not unique to Kenya, but is supported by studies from Botswana, India and Canada (Kealesitse and Kabama, 2012; Kumar and Kapoor, 2017; Macall, Williams, Gleim, and Smyth, 2021).

However, with 68% of Marsabit County residents having no formal education (Muyaka, 2018), it remains unclear how 80% of the study participants read the nutritional information very often or always when making purchasing decisions. This suggests that at least a proportion of them are unable to fully comprehend the written information on the label, and instead use the pictorial elements to infer nutritional information. Many products manufactured in Kenya have no

or incomplete written nutritional information (Cramer et al., 2021). The display of detailed nutritional information may suggest food quality to an illiterate person and build trust in the product (Choudhury, Mukherjee, and Datta, 2019).

The high number of fixations at the bottom of the sticker on the paper bag with pictures of the different ingredients in the porridge can be seen as another indicator of the general interest in the product's ingredients and nutritional information. While the images were purely decorative for the research team, the interest shown by the respondents indicated that they were meaningful to them, especially as the packaging images did not contain any other information about the ingredients of the porridge apart from the pictorial display.

Displaying a cute animal, in this case a cartoon character-like zebra, also leads to a higher level of attractiveness for packaged children's food, as confirmed by the eye-tracking data. Elliott and Truman, 2020) found that such cartoon characters are often used to convince both potential purchasers - in this case parents or caregivers - and consumers - in this case children - that food packaging with such characters contains food specifically designed for children. It can be assumed that the importance of displaying a cute cartoon animal on children's food packaging is particularly high in a place like Marsabit town, where it can help illiterate consumers to identify children's food. The expressed desire to buy more Kenyan food may explain why the logos in the shape of Kenya and the colours of the Kenyan flag were more important than the logo in the shape of Africa. However, the desire itself contradicts the finding of Nandonde and Kuada (2016) from Tanzania, who wrote "that local consumers do not necessarily prefer locally produced products". Kenyan consumers therefore appear to be more home-grown than Tanzanians. In this case, the results of the conjoint analysis are not reflected in the eye-tracking results.

The results from the eye tracking part of our study indicate participants' interest in the infant food ingredients, as there are many fixations on the bottom of the packaging where the images of the porridge's ingredients are displayed. The eye-tracking metrics showed that participants looked at the pack from the top (background element and logo) before moving to the bottom of the pack image (cute animal, then KEBS label and nutritional information). This gaze behaviour could be described as a Z-pattern, a gaze pattern that recipients normally use to get a quick overview of a website (Geise, 2011; Hernandez and Resnick, 2013). As the stimuli, i.e. the packaging, were presented on a computer screen, participants may have used this gaze pattern to quickly take in the visual information.

It is not clear why they fixated the background element the longest, but one reason could be that they were trying to decipher the product description written there. This suggestion is supported by Geise's (2011) comments that increased visual attention may be an indication of increased cognitive load, and thus possibly of too much complexity in the information provided. We are also unable to explain why, according to the eye-tracking metrics, the logo and the cute animal were looked at earlier and more often than the KEBS label and the nutritional information, both of which had a much higher part-worth utility. It can be assumed that because the KEBS logo is widely known in Kenya (Mulama, 2011), respondents were able to recognise it immediately, but found the other design elements more interesting to look at because they were new to them. The same may be true of the nutritional information display; respondents saw it, had difficulty reading it, either because of illiteracy or because of the small font, so paid little further attention to it, but moved on to look at the non-written elements. It may also have played a role that the arrangement of the packaging attributes, combined with the presentation on a computer screen, encouraged participants' gaze to follow a Z pattern (cf. Hernandez and Resnick 2013), and that both the nutritional information and the KEBS label were outside the typical scan path for this gaze pattern.

Food neophobes show a tendency to avoid novel foods, which is a common concern with the introduction of new products to the market. However, Fenko (2019) states that perceived product familiarity could reduce the level of rejection and therefore it is important to emphasise the familiarity of a new product by, for example, focusing on well-known ingredients. According to this finding, the women's group should choose packaging that highlights the familiar aspects of their porridge rather than focusing on the health benefits of unfamiliar ingredients.

Our analysis does not formally link the two datasets, but finds similar results for the conjoint analysis and eye-tracking data in cases where a 'no' attribute level was included, but no relationship when all attribute levels included pictorial elements and a blank space was not part of the attribute levels. When Meyerding (2018) combined an eye-tracking experiment with a choice-based conjoint analysis, he found 'no significant relationship between part-value utilities and eye-tracking measures in any case'. According to Meyerding, this suggests that significant relationships between the results of eye-tracking experiments and conjoint analysis only occur in top-down situations, where participants are forced to make decisions, but not in bottom-up situations, where they are not (2018). In our case, however, the eye-tracking analysis did not require participants to follow a task or answer questions, so their gaze behaviour can be described as stimulus-driven or bottom-up perception.

Nevertheless, the results of this study suggest that the use of a combination of methods is important to provide reliable information on how consumers visually process food labels. Incorporating eye-tracking techniques into the conjoint analysis provided some additional findings that would not have been discovered by conducting a conjoint study alone; in particular, the importance of pictorial representation of ingredients and the suggestion to follow a Z pattern when designing infant food packaging.

6   Conclusions

A general concern about the quality of the food consumed, coupled with a high level of health consciousness, requires local Kenyan producers to gain the trust of consumers. The part-worth utilities of the traditional conjoint analysis applied in this study, as well as the eye-tracking results, indicate that respondents rate infant's food products as attractive when they have a widely recognised food safety mark and detailed nutritional information on their packaging.

Additional elements on the packaging of Kenyan infant's foods should include a picture of a cute animal to help non-literate consumers identify the product as an infant's food and, in the case of products manufactured in Kenya, a logo composed of the colours of the Kenyan flag to indicate the Kenyan origin of the product.

It is also recommended to include pictures of the ingredients of the products when designing the packaging of infant food, as this will help especially illiterate consumers to identify the ingredients of the product.

The limitations of the study need to be considered: The sample group is not representative of the population of either Marsabit County or Kenya, as it consists mainly of mothers and respondents were approached in Marsabit town but not in the rural areas.

It is also likely that the inclusion of a local assistant in the process, who helped with translation and technical access, may have resulted in a desirability bias and influenced the answers provided by respondents.

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